Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

PHET: Salts and Solubility

Directions:

1. Before you being, define the following terms:

Solute:

Solvent:

Solubility:

Saturated solution:

Unsaturated solution:

1. Go to the following web site: <http://phet.colorado.edu/en/simulation/soluble-salts>
2. Click on Run Now
3. Record the volume of the water as written from the data on the right side of the screen. Keep in mind that the value should be in scientific notation. For example 2.5 E – 13 is the same as 2.5 x 10-13.

|  |
| --- |
| Volume of water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Liters |

1. Shake the salt shaker one time to add NaCl to the solution. What happens to the NaCl when it is added to the water?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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How many dissolved particles are there in the solution?

|  |
| --- |
| Particles of Na \_\_\_\_\_\_\_\_\_\_ Particles of Cl \_\_\_\_\_\_\_\_\_\_ |

Is this solution saturated, unsaturated, or supersaturated? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain your answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Shake the salt shaker until some of the NaCl does not dissolve. When this happens, how much Na and Cl is dissolved, how much is not dissolved?

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| --- |
| Amount Dissolved:  Particles of Na \_\_\_\_\_\_\_\_\_\_ Particles of Cl \_\_\_\_\_\_\_\_\_\_ |
| Amount Not Dissolved:  Particles of Na \_\_\_\_\_\_\_\_\_\_ Particles of Cl \_\_\_\_\_\_\_\_\_\_ |

Looking at the solution, do the particles that are not dissolved ever become dissolved?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Do the particles that are dissolved ever become not dissolved?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Do the number of particles dissolved and not dissolved change in a

significant way? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Does this represent a saturated, unsaturated, or supersaturated solution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain your answer: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Now add more water. What happened to the amount of salt dissolved? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Record the following new information:

|  |
| --- |
| Amount Dissolved:  Particles of Na \_\_\_\_\_\_\_\_\_\_ Particles of Cl \_\_\_\_\_\_\_\_\_\_ |
| Amount Not Dissolved:  Particles of Na \_\_\_\_\_\_\_\_\_\_ Particles of Cl \_\_\_\_\_\_\_\_\_\_ |
| Volume of water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ liters |

Does the amount of water affect how much solute will dissolve? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Click on the tab at the top of the screen that says “Slightly Soluble Salts”

What does the term soluble refer to? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Notice in the data on the right side of the box you can change which salt you have. There are 6 different salts listed. Determine how much of each salt you can add to 1.00 x 10-16 liters of water to make it so that some of the solute does not dissolve. You should try and make it so that there is as little solute settled on the bottom as possible. Then calculate the concentration of the solution Record the data in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| Solute | Amount Dissolved | Amount Not Dissolved | Concentration of Solution (total # particles/ liters of solution) |
| Mercury (II) Bromide | Mercury (I) \_\_\_\_\_\_\_\_\_\_\_\_  Bromide \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Mercury (I) \_\_\_\_\_\_\_\_\_\_\_\_  Bromide \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| Silver Bromide | Silver \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Bromide \_\_\_\_\_\_\_\_\_\_\_\_\_ | Silver \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Bromide \_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| Copper (I) Iodide | Copper (I) \_\_\_\_\_\_\_\_\_\_\_\_  Iodide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Copper (I) \_\_\_\_\_\_\_\_\_\_\_\_  Iodide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| Strontium phosphate | Strontium \_\_\_\_\_\_\_\_\_\_\_\_  Phosphate \_\_\_\_\_\_\_\_\_\_\_\_ | Strontium \_\_\_\_\_\_\_\_\_\_\_\_  Phosphate \_\_\_\_\_\_\_\_\_\_\_\_ |  |
| Thallium (I) Sulfide | Thallium \_\_\_\_\_\_\_\_\_\_\_\_\_  Sulfide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Thallium \_\_\_\_\_\_\_\_\_\_\_\_\_  Sulfide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| Silver Arsenate | Silver \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Aresenate \_\_\_\_\_\_\_\_\_\_\_\_\_ | Silver \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Aresenate \_\_\_\_\_\_\_\_\_\_\_\_\_ |  |

Can you dissolve the same amount of each salt into the water? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which of the 6 salts listed above is most soluble in water? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which of the 6 salts listed above is least soluble in water? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. From this activity, what are 2 factors that affect solubility?

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1. What is another factor that affects solubility that we did not look at in this activity?

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